
Puerto Rico Lighthouses

José A. Mari Mut



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1

Introduction

Toward the end of the 19th Century, the Spanish government undertook the task of illuminating our shores through the establishment of a system of lighthouses located at strategic points along the coast. These lighthouses would facilitate not only the international commerce but also that which happened between local ports, at the time the most efficient means of transporting goods to other parts of the island. Although the first plan dates from 1869, it wasn't until the last two decades of the century that the project became a reality, with the construction of twelve lighthouses between 1880 and 1898. When sovereignty changed as a result of the Spanish-American War, the incoming government found a maritime illumination system so well planned and executed that it only required the completion of some structures in progress.

Today the lighthouses are sources of admiration, inspiration and nostalgia for Puerto Ricans of all ages. Automated and closed during the past century, because

they were no longer so useful, several deteriorated to the point of becoming ruins and as such remain. Two disappeared. Fortunately, municipal governments and organizations aware of the historic and touristic value of these structures have restored several of the lighthouses and there's a desire to rescue the rest.

This work describes our lighthouses and presents their condition in 2009. It is dedicated with admiration and respect to all the people who from the lighthouses illuminated the nights of Puerto Rico.

The assistance of the following persons greatly facilitated the progress and completion of this work. María de Lourdes Martínez and Stephen Álvarez kindly received me and shared valuable information during my visits to the Maunabo lighthouse. Equal attentions were received from Carlos Almodóvar and Loraine Serrano at the San Juan lighthouse and from Angelika Vendrell, Juan A. Jesús Díaz, Pedro Guadalupe and Leyla Rivera at the Aguadilla, Arroyo, Cabo Rojo and Punta Mulas (Vieques) lighthouses. Mayor Jorge L. Márquez Pérez allowed me to visit the lantern of the Maunabo lighthouse.

John Reyes, of the Coast Guard in San Juan, answered many questions and provided useful information about the local lighthouses. Sandra Shanklin allowed

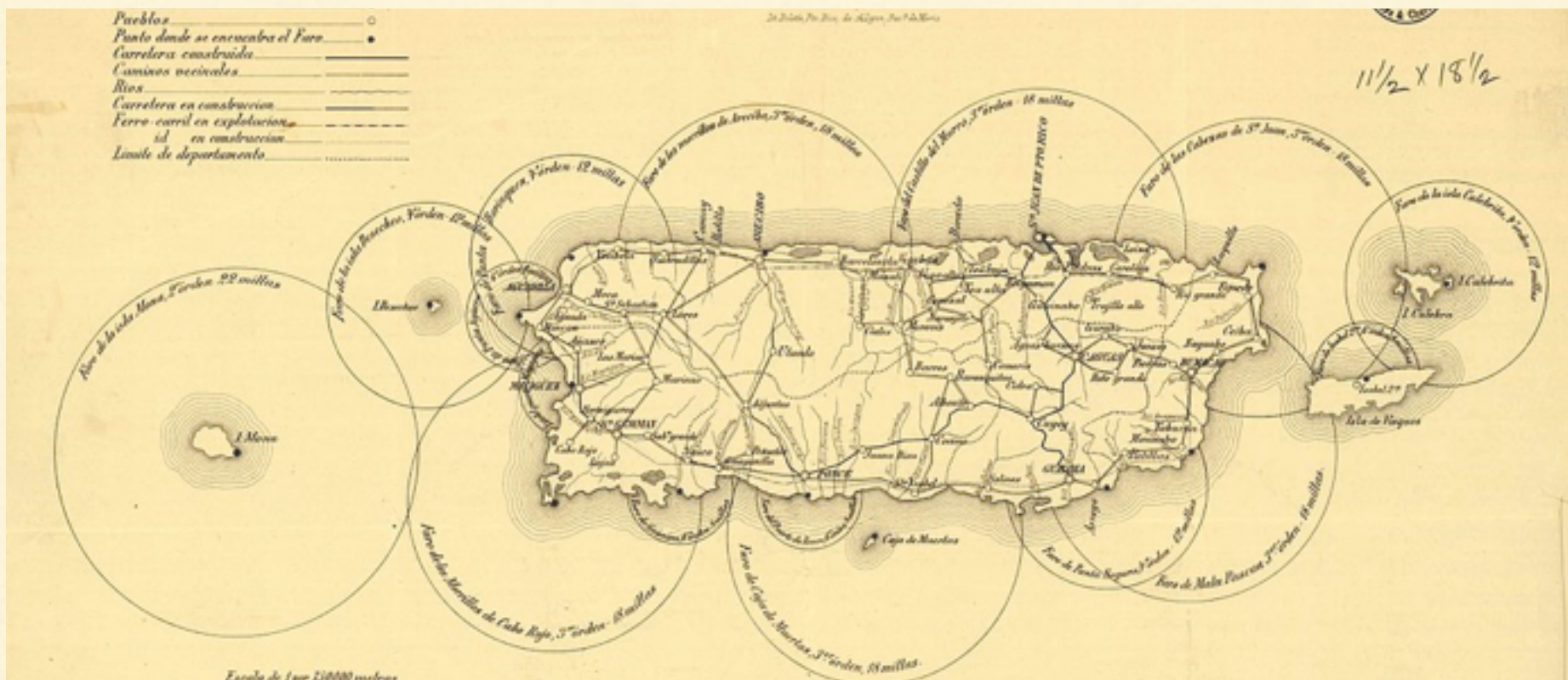
me to reproduce some of the historic photographs included in the compact disk that she and her husband Bob published on the [lighthouses of Puerto Rico](#). Luis Vélez shared information and interesting anecdotes about the time he worked in the Cabo Rojo, Fajardo and Mona lighthouses. [Kristen Ankiewicz](#) kindly authorized the use of four photos that she took in Mona Island in 2008. [Marinas.com](#) provided a special permission to use two of its aerial photographs of the Mona lighthouse. Kraig Anderson, webmaster of [Lighthouse Friends](#), shared information which facilitated my visits to Cardona and Vieques. The friends of the Puerto Rican Collection at the General Library of the University of Puerto Rico at Mayagüez gave me access to an interesting collection of newspaper clippings about local lighthouses.

Finally, my wife, Mayra Acevedo, accompanied me most of the lighthouses, noting details that I often overlooked. She also read and corrected the text.

This work is available in web page format ([this link](#)). That version contains an interactive map with the exact location of the lighthouses.

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2009-2013



2 History

Above- One of several maps illustrating the maritime illumination plan. This undated version includes the Desecheo and Mayagüez lighthouses, which were not built and does not include Vieques' Puerto Ferro lighthouse.

The lighthouses of Puerto Rico are the product of a master plan prepared by the government in response to the needs of maritime trade, which during the 19th century was the only way to import and export products, and the main route for transporting goods from one place to another on the island. The requirements of the plan, the dominant architectural style in Puerto Rico, and the economy of the era are clearly reflected in the location, style, size, and functionality of these buildings. Several elements common to all our lighthouses are presented here in order to provide a unified view and to avoid repetition in the text corresponding to each structure.

The main criterion used for choosing the location of the lighthouses was the need to illuminate specific areas of the coast so that any ship approaching the island would always have one or more lights to guide it on its way to other countries, or in navigating to one of the local ports. For this reason many of the lighthouses were built in remote locations, some still difficult to reach, such as the Caja de

Muertos, Culebrita, and Mona lighthouses. Remoteness, the need to manually operate the lights (electricity had not yet been invented), and the preference for integrating the tower and the keepers' residence in a single building explains why the lighthouses are not isolated towers but rather homes equipped to meet all the needs of the families of that era.

The architecture of our lighthouses is Neoclassic, a style dominated by simple but elegant straight lines. Only the Guanica and Rincon lighthouses deviated notably from this style, since they had complex brick cornices and parapets that reveal some Moorish influence. The San Juan lighthouse also has a Moorish touch which was repeated in the Ceiba lighthouse.

Our lighthouses can be separated into two groups with respect to their size and importance. Large or primary lighthouses, like those at Cabo Rojo, Maunabo, and Fajardo were built for two keepers and their families. Typically, the building has one door, a central corridor leading to the tower, and identical living spaces on both sides of the corridor. The main function of these lighthouses was to illuminate strategic points along the coast, and since the light had to be visible from afar, they were equipped with second, third or

fourth-order lenses. Small or secondary lighthouses, like those at Arroyo, Ponce and Vieques, were designed for one keeper and his family. These lighthouses, which illuminated ports and areas reached marginally by the larger lighthouses, were equipped with fifth or sixth-order lenses.

All the lighthouses had a cistern for storing rainwater collected on the roof. The roofs were constructed of balata wood beams and trellises which generally supported several layers of bricks joined by a sand and lime mortar, the top layer of bricks was covered with tar or pitch to reduce filtrations. The inner layer of bricks was covered by a lime wash and the beams and trellises were painted to protect them from moisture. Walls were built of brick and stone, while external doors and shutters were made of capá or other local woods. At a minimum, the floor of the lobby, the main corridor, and the base of the tower were covered in marble (Genoa slabs). The floor of the keepers' quarters were covered with pine wood, while that of work areas, fuel deposit, and kitchen were made of cement. The large lighthouses had modern kitchens and toilets, while the small ones had wood-burning stoves and latrines.

The lighthouse tower is cylindrical, hexagonal or octagonal and may be at the

center of the building or attached to the rear facade. The most notable element of its interior is the spiral iron staircase, imported from France, that leads to the building's roof and then to the lantern. The tower's height depends on the terrain's elevation and the power of the lens: lights located at sea level require higher towers than those built on promontories, while primary lighthouses have to project their light from a higher point so as to reach further. The towers of the local lighthouses are short when compared to those of most Spanish lighthouses built in Cuba and the Philippines.

The lantern is the metal and glass structure crowning the tower. All the lanterns of the Spanish lighthouses, complete with their lamps and lenses, were purchased in Paris, where several companies specialized in lighthouse equipment operated. The lantern was surrounded by a decorative iron balustrade that protected the keepers when they cleaned the exterior. The roof of the lantern has a ball with ventilation holes, followed by indicators of the cardinal points, a vane to indicate wind direction, and a platinum-tipped lightning rod. A steel-wire cable descended from the rod to the ground. In the center of the lantern was the lamp, surrounded by the lens. The

lamps burned fuel imported from New York, where a specific variety called bright light was distilled for use in lighthouses. The fuel was stored in an oil room, which in some lighthouses is below the tower. Whale oil was not used as fuel in Puerto Rico.

The lighthouses were equipped with Fresnel lenses, named in honor of French physicist Augustine-Jean Fresnel (1788-1827). The size of the lens and the number of prisms are proportional to its power and range. First-order lenses have a range of 24 miles, are formed by over a hundred lenses and prisms, are about 10 feet tall and weigh over a ton. At the other extreme, sixth-order lenses have a range of eight miles, are about 2 feet tall, have about a dozen lenses and prisms, and are relatively light. The most powerful lens used in Puerto Rico was the second-order optic of the Mona lighthouse. The other primary lighthouses used third or fourth-order lenses, while the secondary lighthouses used fifth or sixth-order lenses. The only lighthouses that retain their original lenses are those at Maunabo and San Juan, all others have beacons installed later. The Coast Guard has a small museum in San Juan where several lenses are exhibited, including the original lens of the Ponce lighthouse.

Fifth and sixth-order lenses were fixed but the others were mounted on a base that rotated around the lamp. The shape of the lens and the rotational speed produced a flashing pattern specific for each lighthouse, thus allowing its identification from afar. The force needed to rotate the lens was provided by a clock mechanism driven by weights which in most of lighthouses descended through the stairway's column. When the weights reached the bottom, which could happen in just two hours, the keeper had to climb to the lantern and turn a lever to raise them. During the day a curtain protected the lamp from the sun's concentrated rays.

During the first decades of the last century electrification of the lighthouses started, first through generators and then through power lines. The oil lamps were replaced by light bulbs and the clock mechanisms by electric motors. With the lights automated, resident personnel was no longer necessary and the structures began to be closed, abandoned, and inevitably deteriorated. The classic era of the lighthouses reached its end. After half a century or more of neglect, interest for the lighthouses has revived and several have been beautifully restored. Slowly they return to life and begin a second era, where as tourist attractions and as part of

our cultural heritage they are witnesses of a very special past.



3

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Arecibo: [Texto](#), [fotografías](#)

Arroyo: [Texto](#), [fotografías](#)

Cabo Rojo: [Texto](#), [fotografías](#)

Caja de Muertos: [Texto](#), [fotografías](#)

Culebrita: [Texto](#), [fotografías](#)

Fajardo: [Texto](#), [fotografías](#)

Guánica: [Texto](#), [fotografías](#)

Maunabo: [Texto](#), [fotografías](#)

Mona: [Texto](#), [fotografías](#)

Ponce: [Texto](#), [fotografías](#)

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4

Aguadilla (Punta Borinquen)

The first Aguadilla lighthouse, locally known as Las Ruinas (the ruins), entered service on September 15, 1889. It was designed by Enrique Gadea and built by Pedro Tolosa at Point Borinquen, the northwest tip of the island. The engineers considered building the lighthouse on the higher ground where decades later its substitute was built, but concluded that the many cracks present there would make it more vulnerable to earthquakes. Lack of satisfaction with its visibility from the northeast led in 1911 to a request for funds to destroy it and build a new lighthouse.

In 1918, before work on the new lighthouse had started, a strong earthquake damaged the tower and weakened the rest of the structure to the point that shortly afterwards it was closed and abandoned, to the ravages of the weather and vandalism. Today the only remains of this elegant lighthouse, which measured 91 feet long and 41 feet wide, are the front facade and one lateral wall. We can nevertheless have the illusion of visiting it through its twin brother, the Maunabo lighthouse; these two structures were

distinguished only by their color and the details of the tower's cornice, which in the Aguadilla lighthouse exhibited elaborate Moorish details. The building was painted red and white; part of the red paint, now very bleached by the sun, remains on the stucco of the front wall. The octagonal tower was 45 feet high and was located at the center of the building. The fourth-order lens, destroyed by the earthquake, projected its light twelve miles away, illuminating the northwest tip of Puerto Rico and the entrance to the Mona Passage.



Frontal view, Feliciano Alonso, c. 1895.



Rear view, Feliciano Alonso, c. 1895.





Taken by the Coast Guard after the 1918 earthquake. Note the reinforced tower and the damage to the walls. Courtesy of thelighthousepeople.com



The second Aguadilla lighthouse is on the promontory visible at the background.



Base of the tower





Rear view



5

Aguadilla (Punta Gorda)

The second Aguadilla lighthouse entered service in 1922, substituting the original lighthouse, which was damaged by an earthquake in 1918. It was constructed little more than a mile away from the first lighthouse and over 200 feet above sea level, on the area then known as Punta Gorda. Here the light was more visible to the ships that sailed from Europe to the Panama Canal. This tower is 60 feet tall and does not connect to the keepers' residence, which measures 56 feet long by 40 feet wide.

The third-order lens was constructed by the Macbeth Company in New York and projected its light 18 miles away. As in the other lighthouses, the weights that rotated the lens descended through the column of the spiral iron stairway. In 1947 the lantern was removed and the lens was substituted by a pair of search lights more appropriate for air travel, since by then the lighthouse was located in the Ramey Air Force base. Years later these lights were substituted by the smaller pair used today. The tower was finally automated in 1976. Access to the lighthouse grounds

is limited to Coast Guard employees who rent the residence. The living rooms of both apartments conserve the white, gray, and black tiles installed in 1922. The lighthouse can be observed from the entrance gate and from the adjacent golf course.



View from the entrance gate



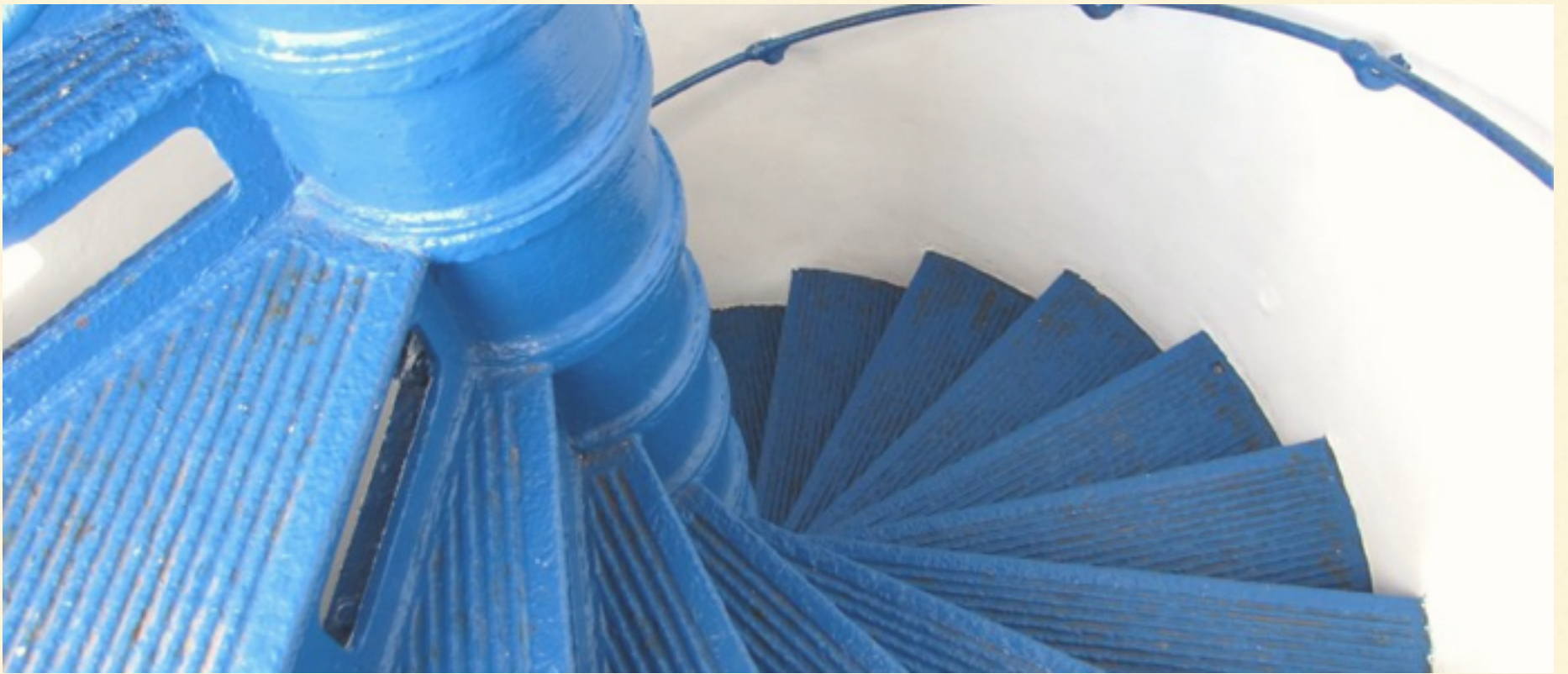
View from the golf course



Before 1947, note the intact lantern



Original tiles



6

Arecibo

The Arecibo lighthouse entered service in 1898, months after the end of the Spanish-American war. It was designed by José María Sainz and built over the dark-sandstone promontory known as Punta Morrillos. The original concept was similar to those of the Aguadilla and Maunabo lighthouses, but later the tower's height was reduced to 41 feet, its was made hexagonal instead of octagonal, and it was moved to the rear wall of the building. The fuel storage room was relocated under the tower and an arch was added to the cornice over the entrance door.

The lighthouse measures 84 feet long by 40 feet wide and was originally painted white with dark-gray details. The stairway and its handrail are almost identical to those of the Maunabo lighthouse. The third-order lens projected the light eighteen miles away. In 1931, the kerosene lamp was substituted by a bulb whose energy was generated for a while by a windmill mounted on the roof. Before 1949 the tower's iron balustrade was substituted by a cement parapet and substantial renovations were done in 1959, which

included the substitution of the brick roof by a concrete one. The lighthouse was automated and closed in 1964, after which it was vandalized on many occasions, the lens being destroyed between 1975 and 1977. A private company restored the building in 2001, when a new lantern was installed. The lighthouse opens daily to the public as the main attraction of the Arecibo Lighthouse and Historical Park.









7

Arroyo

The Arroyo or Point Figuras lighthouse entered service on March 16, 1893. It was built as a link between the Caja de Muertos and Maunabo lighthouses, and as a guide for the Arroyo and Patillas ports. Little is known about its construction but it evidently served as model for the Vieques lighthouses, which are similar and share the peculiar pattern of alternating circles and rectangles at the base of the cornice. The Arroyo lighthouse, however, did not have the same distribution of spaces, the tower was taller, and the building originally had no rear door. The lighthouse measures 59 feet long by 26 feet wide.

It was originally painted light gray with white details and black baseboard. The fifth-order lens projected its light twelve miles away. The octagonal tower is 44 feet tall and is located at the center of the building. In 1938 an automatic light was installed near the beach and the lighthouse was boarded and closed. The building reopened during World War II as an observation post and was closed again after the war. The army leased its surroundings until 1963, after

that date the structure was vandalized repeatedly and deteriorated to the point that only the walls, the tower, and a small segment of the roof remained. The lantern and the lens were apparently destroyed by vandals in 1969. The National Parks Company restored the lighthouse in 2003 and incorporated it to the adjacent Point Guilarte National Park. The lantern and the tower's stairway are the only elements that did not follow the structure's original design.



Feliciano Alonso, c. 1895



Rear view. Note the well, cistern, and rear door (added later)



The balustrade installed in 2003 is faithful the original.





Restored kitchen and chimney



Restored beams and brick ceiling





8

Cabo Rojo

The Cabo Rojo, or Morrillos de Cabo Rojo lighthouse entered service on August 20, 1882. Its first keepers were José Pérez Barrios and Eugenio Fiol. It was designed by Enrique Gadea and built by the government itself on the western cape (morrillo) that forms the southwest tip of the island. The project was difficult due to the site's isolation and took five years to complete, for his accomplishment Eng. Gadea received the King Charles III knight cross. The building measures 90 feet long by 38 feet wide.

It was painted gray with white details and green windows, the same colors it has today. The 41-foot tower is hexagonal and connects to the rear or south face of the building, a room under the tower stored the fuel for the lamp. The tower's stairway lacks a central column, so as in the Fajardo lighthouse, the weights that rotated the lens descended through a duct built into the tower's wall; the two pulleys that guided the weight's cable are still in the tower. The third-order lens projected its light eighteen miles away, the present light is an electrical beacon originally designed for

airport use. In 1959 the building's spaces were redistributed, a vestibule was constructed at the entrance, and a rear door was added, but the original brick roof remained intact. In 1960 the clock mechanism was substituted by an electrical motor. The lighthouse was automated and boarded in 1967 but the original lens was used at least until 1978. The Cabo Rojo municipality administers the building.



Feliciano Alonso, c. 1895



View from the other cape on the southwest end of the island





The entrance vestibule was added around 1960.







9

Caja de Muertos

The Caja de Muertos lighthouse entered service on August 15, 1887. Its first keepers were Severo del Olmo and César Prieto. It was designed by Manuel Maese and built by the government itself at the top of this island located eight miles from Ponce, and whose appearance resembles an old coffin. The building measures 81 feet long by 51 feet wide and has an H shape unique among local lighthouses, with the 41-foot tall tower located at the center of the structure. Behind the tower was the fuel storage room, which ventilated through a circular blind.

The building was painted light blue with white details and black baseboard. The third-order lens, which projected its light eighteen miles away, was substituted in 1945 by a fixed lens which is exhibited in the Coast Guard's small museum in San Juan. Today the light is produced by a plastic beacon fed by solar panels. The lighthouse was automated and its windows were sealed in 1968 without the structure having been significantly altered. The tower's balustrade is not original. Although the remote location has protected it

from the vandalism suffered by other lighthouses, deterioration due to neglect is evident. The roof, for example, has a large hole through which rainwater enters the building, the high internal humidity has surely contributed to the deterioration of the roof beams and other elements of the structure.



Feliciano Alonso, c. 1895



Coast Guard, 1978





Current beacon



10

Ceiba

The Ceiba lighthouse entered service in 1908. It was designed following the style used for the San Juan lighthouse (El Morro), and constructed on Cabras Island, the eastern tip of Puerto Rico, opposite Vieques Island. The establishment of a lighthouse at this location was included in the first maritime illumination plan (1869) but was discarded later. The building was constructed of gray stone, with white trim, and had a sixth-order lens. It had one room on each floor and was occupied by a keeper until 1931, when an acetylene torch was installed. The building was closed and boarded in 1937. In 1965 an automatic light was installed on a tower nearby and a year later the lighthouse was demolished.



Taken by the Coast Guard in 1916, courtesy of thelighthousepeople.com



Taken by the Coast Guard in 1946. Note the acetylene torch on the tower and Vieques on the background.



Taken by the Coast Guard, courtesy of thelighthousepeople.com



11

Culebrita

The Culebrita lighthouse entered service on February 25, 1886. Its first keepers were Francisco Cabanellas and Pedro del Olmo. It was designed by Manuel Maese and built by the government itself on the summit of this small island because it is the highest point in the Culebra archipelago. Due to its location in an isolated, uninhabited place, the construction was very costly and difficult. Water, food and most of the construction materials had to be transported from Fajardo or Vieques. It was also difficult to hire the workers.

The Culebrita lighthouse is unique among local lights by its E-shape, with the tower connected on one side to the vestibule of the two keepers' residence and on the other to the fuel deposit. The fourth-order lens projected its light twelve miles away, illuminating to the west the passage between Culebra and Puerto Rico and to the east the passage between Culebra and the Virgin Islands. The original lens was destroyed by a hurricane (San Ciprian) in 1932 and was substituted by a third-order lens. The Coast

Guard boarded the building in 1959 but the U.S. Navy used it sporadically as an observation post until 1975, when an automated beacon was installed; the small plastic beacon currently used is fed by solar panels. The weather, vandalism, and a failed restoration project in 2003 have left the building in ruins. The lantern's dome was blown away by a hurricane and lies nearby among the vegetation.



Feliciano Alonso, c. 1895



US Coast Guard, 1978







Main entrance to the tower



Original marble tiles



12

Fajardo

The Fajardo or Cabezas de San Juan lighthouse entered service on May 2, 1882 as the first lighthouse inaugurated under the island's maritime illumination plan. Its first keepers were Ramón Dordal (who died of malaria three weeks after assuming the post), José Pérez Barrios, and José Rodríguez Parada. It was designed by Enrique Gaeda and built by Manuel Nursa on the highest point of the northeastern tip of the island. Due to the area's elevation, the 36-foot tower attached to the rear face of the building is proportionately one of the shortest among the local lighthouses.

The building measures 98 feet long by 41 feet wide. It was painted gray and white with green windows, the same colors it has today. Three distinguishing characteristics of this lighthouse are the presence of a portico, the absence of an iron balustrade in the tower, and the elaborate design of the tower's stairway, definitely the most beautiful among local lighthouses. The stairway lacks a central column, so as in the Cabo Rojo lighthouse, the

weights that rotated the lens descended through a duct built into the tower's wall. The fuel for the lamp was stored in a room located under the tower. The third-order lens, which projected its light eighteen miles away, was substituted in 1916 by a fourth-order one that was destroyed in 1932 by Hurricane San Ciprián. Another fourth-order lens was installed, followed by the present electric beacon originally designed for airport use. During the 1950s significant renovations were made, including the redistribution of internal spaces, the installation of an iron balustrade on the tower and the addition of a rear door, but the original marble floor and brick roof remained intact. In 1975 the surrounding land was purchased by the Puerto Rico Conservation Trust, which in 1990 meticulously restored the lighthouse.



Feliciano Alonso, c. 1895





Date when construction of the building ended, it was inaugurated in 1882.









13

Guanica

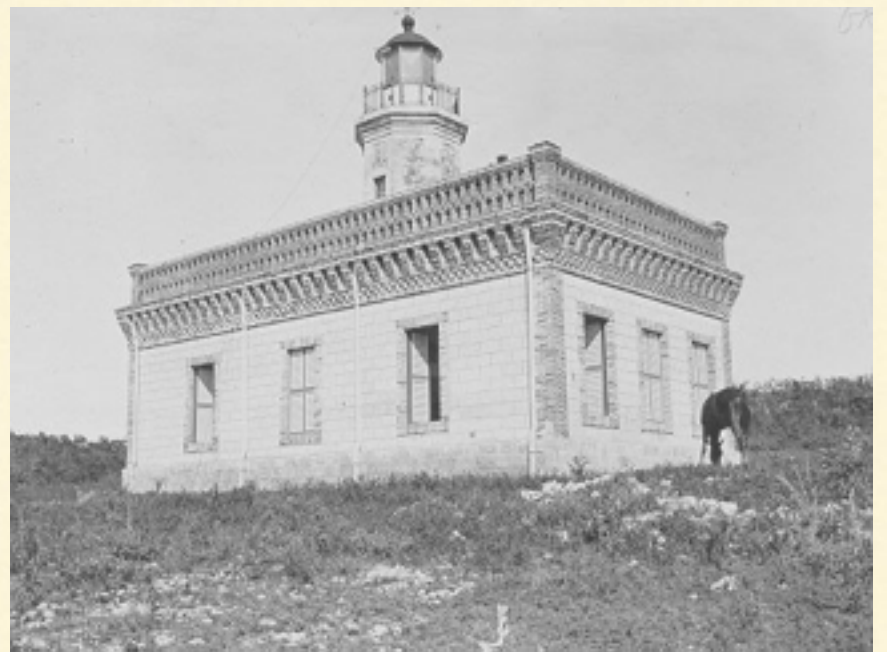
The Guanica lighthouse entered service in 1893. It was designed by José María Sainz and built on a plateau (Point Meseta) just east of the entrance to the Guanica harbor. The building is 50 feet long by 28 feet wide. In contrast to most lighthouses, which followed a sober Neoclassic style, this one (like the first Rincon lighthouse) had an elaborate brick cornice and parapet. The rustic stone walls were covered with white stucco that imitates the texture of the baseboard rocks.

The coat of arms of the Corps of Road, Channels and Ports Engineers was placed on top of the entrance. The octagonal tower is at the center of the building and measures 33 feet tall. The sixth-order lens projected its light eight miles away. On July 25 1898, keeper Robustiano Rivera spotted the invading American forces and quickly travelled to Yauco to inform the Spanish authorities. The lighthouse was used briefly as a hospital during the short war. The building was transferred to the government of Puerto Rico in 1940 and the light was extinguished in 1950, since then the

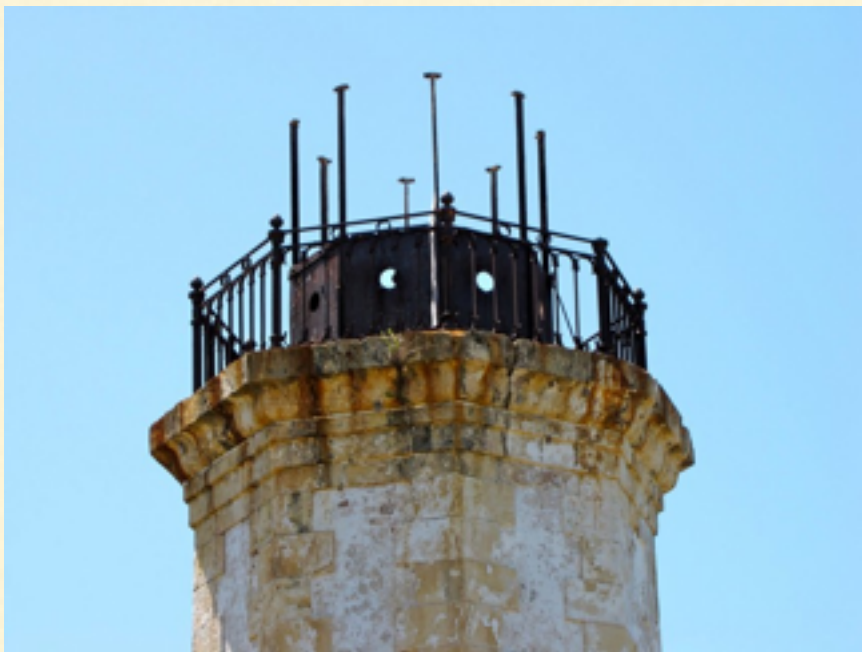
lighthouse has deteriorated to the point that the only remains are the exterior walls, the tower (with its iron balustrade surprisingly in excellent condition) and a very small section of the roof. The cistern and well are near the building. In May 2007, the Guanica municipality and the Department of Natural Resources signed an agreement to restore the lighthouse and its surroundings, but work has not started.



Frontal view. Feliciano Alonso, c. 1895



Taken by the Coast Guard

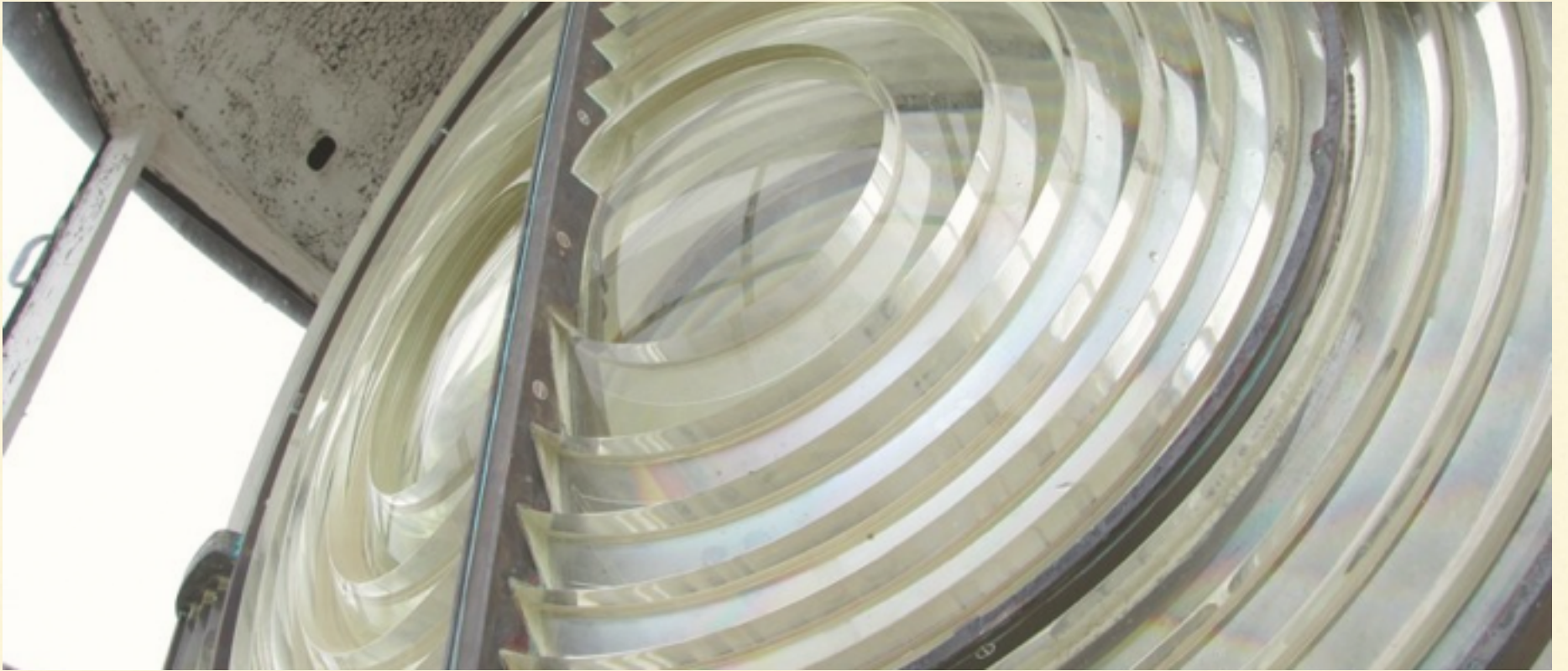


Remnants of the stairway and handrail





The only remnant of the roof



14

Maunabo

The Maunabo or Punta Tuna lighthouse entered service on November 18, 1892. It was designed by Joaquín Gisbert and constructed by Adrián Duffaut over the promontory known as Punta Tuna or Punta de la Tuna, at the southeastern tip of the island. The building measures 91 feet long by 41 feet wide and was originally painted white with dark-gray details. Its twin was the first Aguadilla lighthouse, from which it only differed by its color and by the shape of the tower's cornice. The tower is octagonal, 43-feet tall, and placed at the center of the building.

The lamp fuel storage room was located behind the tower and ventilated to the outside through a small blind. A substantial renovation took place around 1960 which included the redistribution of internal spaces, the construction of a vestibule for the entrance, the addition of a rear door, and the substitution of the brick roof by a concrete one. The third-order lens, which projected its light eighteen miles away, was used until the late 1970s. This lens and that of the San Juan lighthouse are the only

original lenses remaining in our lighthouses; unfortunately, two of the three panels of the Maunabo lens were damaged by vandals. The clock mechanism that rotated the lens was substituted in 1939 by an electric motor but remains in the lantern, and the weights that turned it are in the stairway's central column. Currently the light is produced by a small beacon powered by solar panels. The tower's iron balustrade, although oxidized, retains its original beauty. The lighthouse is administered by the Maunabo municipality.



Feliciano Alonso, c. 1895



The vestibule at the entrance was added around 1960





The only intact lens panel



Clock mechanism that rotated the lens.
Note the winding crank



Weights that moved the clock
mechanism





Arch woodwork is original, not so the window



15

Mona

The Mona lighthouse entered service on April 30, 1900. The Spanish engineer Rafael Ravena prepared two very different plans, one for a traditional masonry building with a central courtyard and twenty-five rooms, which would have been the largest lighthouse in the Caribbean, and the other for an iron tower flanked by two wood and metal buildings 64 feet long by 50 feet wide. Both designs would house three keepers. The second option was chosen in November 1885 due of its lower cost and easier construction.

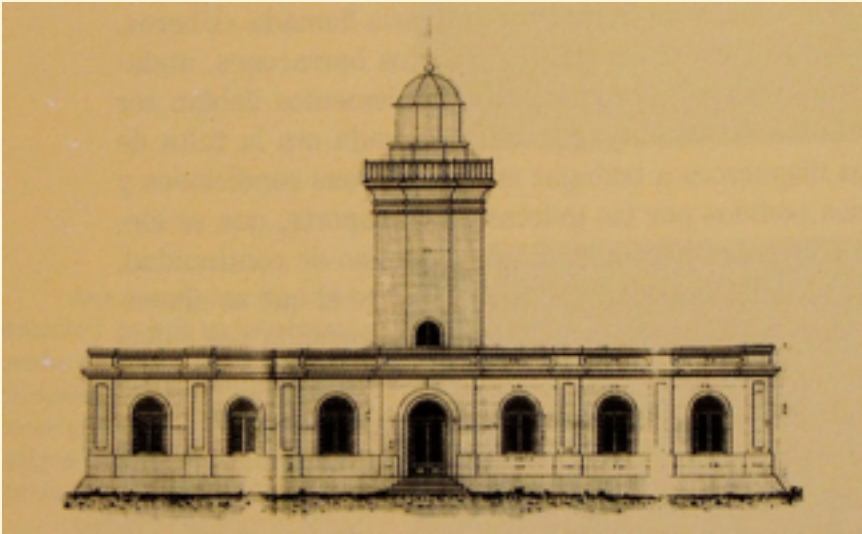
The difficulty of transporting materials to Mona and other obstacles delayed construction so that at the end of the Spanish-American War only part of the material was onsite. The U.S. government obtained the remaining material and finished the project, albeit with one residence instead of two. The precise location where the lighthouse was inaugurated is not altogether clear; a large cistern roughly midway between Playa Pajaros and the current lighthouse suggests that the lighthouse may have been initially located

there and that a few years later it was moved to its present location. Historian Walter Cardona-Bonet identifies the location of the cistern as that of the first lighthouse, but without further details. Although it is frequently written and commented that the tower was designed by Gustave Eiffel, no mention is made of the fact in Nistal-Moret's study nor in the well-documented work *Faros Españoles de Ultramar*. On the contrary, Ravena's project describes and illustrates the tower just as it was constructed. The Mona lighthouse had the only second-order lens used in Puerto Rico, which projected its light 22 miles away; this lens is in Mona, disassembled and under the custody of the Department of Natural and Environmental Resources (DRNA). The light was electrified in 1938 and automated in 1973. The building was transferred to the DRNA in 1976 and was abandoned in 1981. Since then the tower has deteriorated to the point of being considered beyond repair.

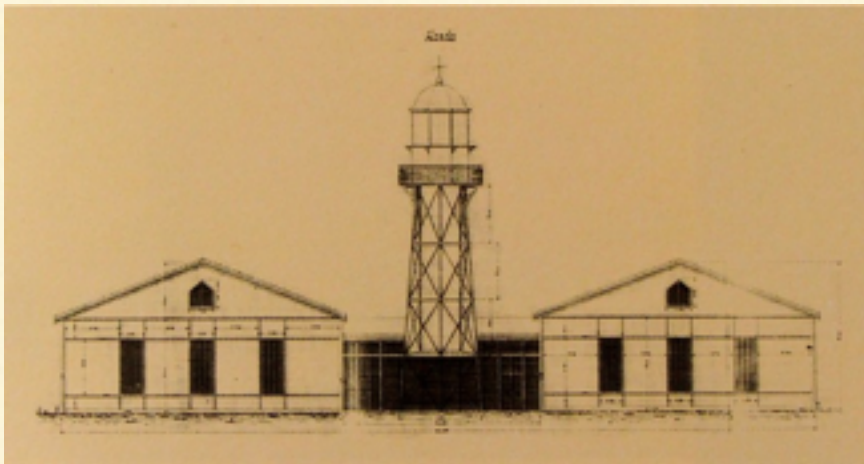


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Plan for the masonry lighthouse. Taken from Faros españoles de ultramar.



Original plan for the metal lighthouse. Taken from Faros españoles de ultramar.



Rafael Rodríguez, c. 1978



c. 2005



Lucas Limonta 2011



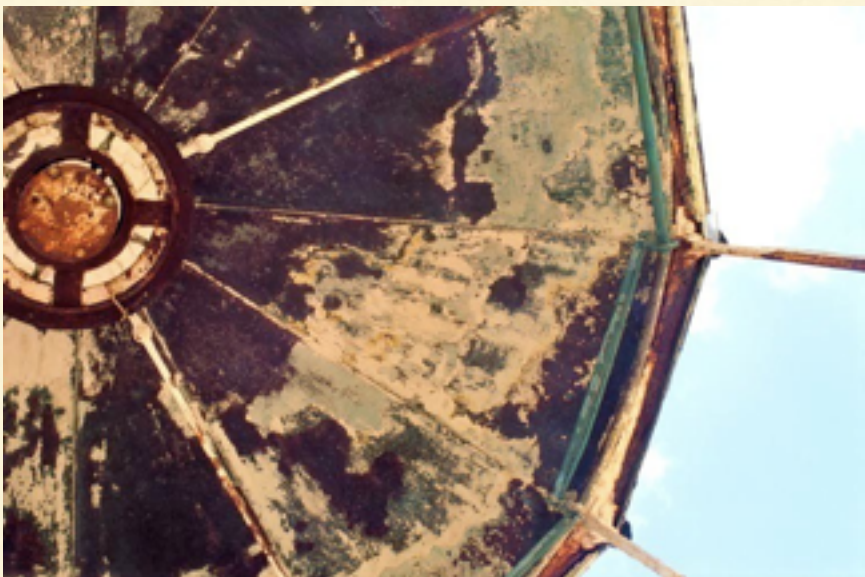
Rafael Rodríguez, 2007



Kristen Ankiewicz, 2008. Used with permission from cavesandmountains.com



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16

Ponce

The Ponce or Cardona Island lighthouse entered service on August 15, 1889. It was designed by Manuel Maese, amended by Rafael Ravena and built by the government itself, on this six-acre island located two kilometers south of Ponce. This lighthouse was not included in the island's original illumination plan but was added due to the pressure of the Playa de Ponce businessmen, who in 1880 paid for the installation of a light on the Port Authority building.

The initiative was quickly rejected by the central government, which ordered the light seized and operated by an auxiliary keeper until an adequate lighthouse could be constructed. The Ponce port and Cardona were considered as possible locations and Cardona was chosen mainly because it was one of the obstacles to navigation in the area. The building measures 48 feet long by 27 feet wide and resembles superficially the Arroyo and the two Vieques lighthouses, but is smaller, has a different distribution of spaces, and its 32-foot tower is cylindrical and connects to the rear face of the building. The structure was originally

painted light blue with white details and black baseboard. The sixth-order lens projected its light eight miles away and was used at least until 1978. Today it is housed in the Coast Guard museum in San Juan, its base bears the inscription Sautier, Lemonier & Cie Paris 1888. The lighthouse was closed around 1950 and automated in 1962, it currently operates with a lantern fed by solar panels. The building is in fairly good condition but it is surrounded by vegetation and salt spray has severely corroded the lantern. Humidity has also affected the ceiling's wood support. Cardona can be observed from road no. 2's overpasses near Ponce, from the tower at La Guancha, and from the end of the La Guancha boardwalk.



Rear view. Feliciano Alonso, c. 1895



Frontal view. Feliciano Alonso, c. 1895



Note the kitchen's chimney at the left



Lens missing some of the lower elements





Rafael Rodríguez, 2007







17

Rincon I

The first Rincon or Point Higuero lighthouse entered service on January 17, 1893. It was designed by José María Sainz and built by the government itself on high ground at the western tip of the island, in order to guide ships navigating the Mona Passage. In contrast to the other lighthouses, which followed a sober Neoclassic style, this one (like the Guanica lighthouse) had an elaborate brick cornice and parapet. The rustic stone walls were covered with white stucco that matched the baseboard rocks.

The coat of arms of the Corps of Roads, Channels and Ports Engineers was placed over the entrance. The lighthouse measured 50 feet long by 28 feet wide, with the octagonal 32-foot tower located at the center of the structure. The sixth-order lens projected its light eight miles away. The 1918 earthquake cracked and weakened the structure to the point that it was judged unsafe and a new wooden dwelling for the keeper was erected nearby. The tower was reinforced and continued operating until 1921, when the lantern was moved to the new lighthouse, on top

of which it still remains. The tower was removed and the lighthouse was transformed into a school. The building was demolished in 1931; its foundation persisted until the mid-1990s, when it was removed during the construction of the park that houses the current lighthouse.



Year 1921, after the earthquake. Note the reinforced tower and the new keeper's house.
Courtesy of thelighthousepeople.com



Feliciano Alonso, c. 1895



1925, without the tower and converted into a school



Año 1913. Courtesy of
thelighthousepeople.com



18

Rincon 2

The second Rincon or Point Higuero lighthouse entered service on January 12, 1922. It was built by the government itself on the western tip of the island, near the first lighthouse, which was damaged by the 1918 earthquake and demolished in 1931. To reduce the likelihood of damage by earthquakes, the new lighthouse was constructed of concrete. The wooden house built near the old lighthouse after the earthquake continued to be used as the keeper's residence. The tower is 70 feet tall and is very similar to that of the second Aguadilla lighthouse, but it is narrower and taller, aside from the fact that the stairway and central column are made of cement instead of metal. Although the original intention was to install a helical bar lantern, like those used in the second Aguadilla and San Juan lighthouses, the first lighthouse's lantern was installed tentatively and as such remains today.

The tower was automated in 1933 and the residence plus the other support structures were destroyed by fire years later. A 1922 report suggests that the lens of the first lighthouse

survived the earthquake and was used in the new lighthouse. The buoy light illustrated at the end was installed later and used at least until 1978, today it is kept at the Coast Guard Museum in San Juan. Currently the light is produced by a small beacon fed by solar panels. The lighthouse is the main attraction of a passive park administered by the Rincon municipality and which opens daily to the public. The tower, however, is closed.



View from road 413





The lantern is the only remnant of the original Spanish lighthouse







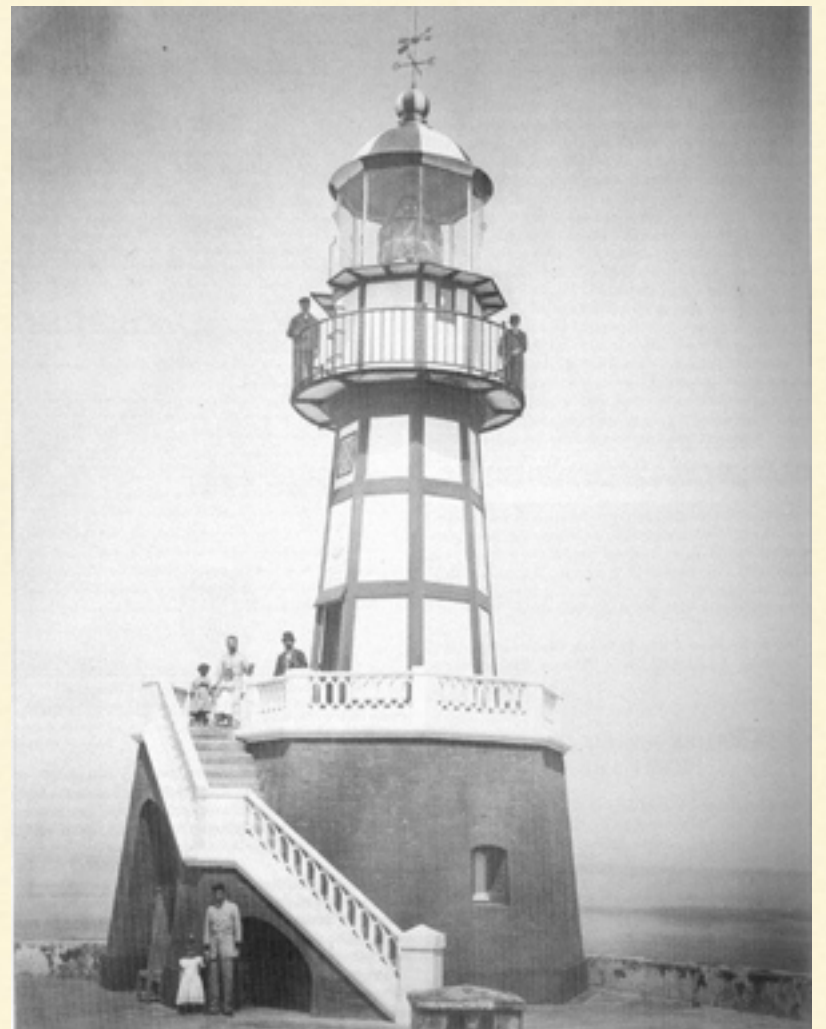
19

San Juan

The first San Juan, or El Morro Castle lighthouse, entered service on January 1, 1846. Its first keepers were Manuel Soto and Narciso Sánchez, both recently arrived from Cuba, and whom like all other keepers of this lighthouse, lived in the adjacent city and not in the fort. The lighthouse was built on the bastion closest to the bay entrance (Austria Bastion) and consisted of an octagonal brick base, an octagonal iron tower, and a lantern equipped with five lamps and an equal number of parabolic reflectors. Its visibility from the northeast was not optimal and because of this, and other problems, the lighthouse was disassembled moved to the bastion closest to the sea (Ochoa bastion), where it entered service on April 1, 1876, this time painted dark-gray and white, the same colors it has today.

The lighthouse was equipped with a new lantern and a third-order Fresnel lens which projected its light 18 miles away. The bombardment of El Morro in 1898 caused irreparable damage to the tower and the lantern. In 1899

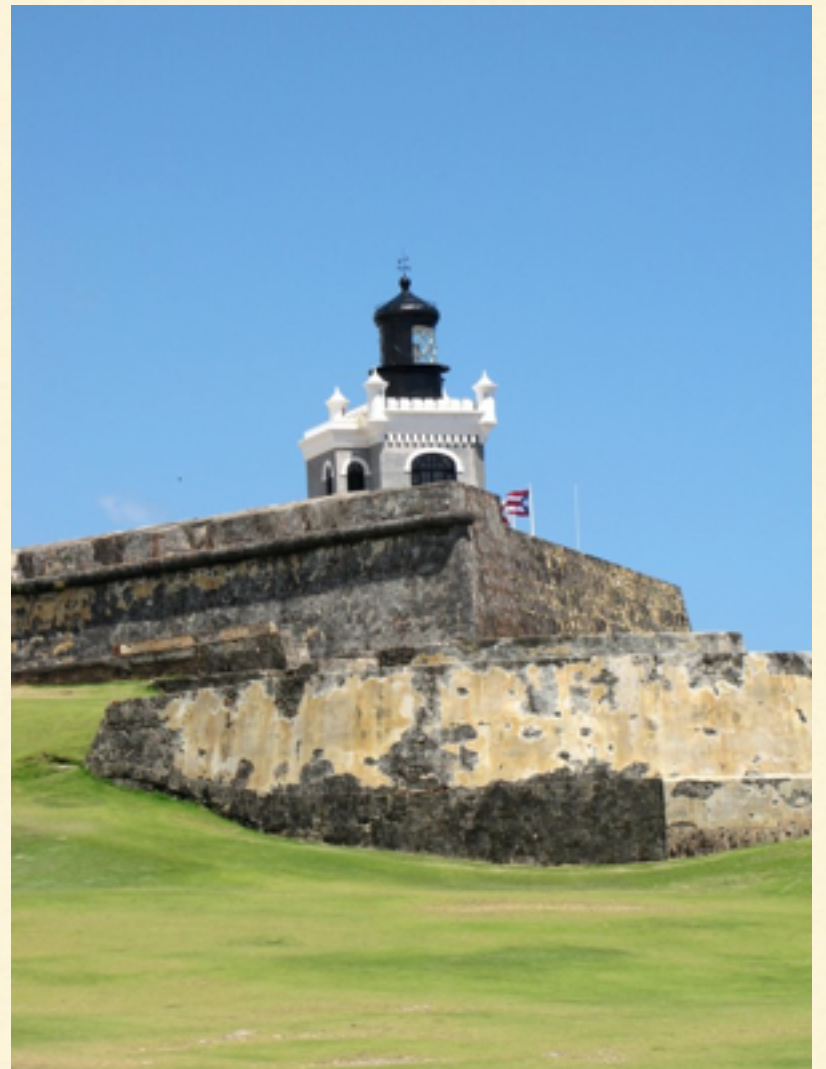
the base was repaired, a new concrete tower was built, and a new lantern and lens were installed. In 1905 the tower developed a crack so large that it was decided to demolish it and build over the remains of the base the current brick lighthouse, which entered service in 1908. This 42-foot tall structure was equipped with another third-order lens which today projects its light 18 miles away. This lens, peculiar for not having top or bottom prisms, is the only original Fresnel lens used in the island. In 1932 the clock mechanism that rotated the lens was substituted by an electric motor and in 1962 the light was automated. The design of this lighthouse has been a source of controversy over the years, for some it is a beautiful structure and for others it is a discordant note in El Morro's architecture.



First lighthouse. Feliciano Alonso c. 1895



Second lighthouse around 1900. Note the curtain that covered the lens during the day.









20

Vieques (Punta Mulas)

The Punta Mulas lighthouse entered service on June 1, 1896. It was designed by Francisco de Albacete and built by the government itself on a promontory near the port of Isabel II, to illuminate the Vieques passage and to guide navigation into the port, which exported cattle and various crops. The building measures 53 feet long by 35 feet wide. It closely resembles the Arroyo lighthouse, with which it shares the pattern of circles and rectangles in the cornice, and is almost identical to the one at Puerto Ferro, just opposite on the south coast of Vieques.

The building was initially painted light gray with white details and baseboard. The 28-foot tall octagonal tower is at the center of the structure, its sixth-order lens projected a red light eight miles away; currently the light is produced by a beacon fed by solar panels. The two Vieques lights are the only Puerto Rican lighthouses built originally with two doors, of which the rear is flanked by two circular openings (bull's eyes) which ventilated the bathroom and the kitchen. Over the entrance facing the sea there is a base for a flag

post which does not figure in the original plans. Since both lighthouses were constructed on high ground, their towers are short and their only opening to the outside is the door leading to the roof. The interior of the lighthouse was completely remodeled during the 1940s but the exterior appearance, the lantern (whose interior is lined with wood) and apparently the brick roof remained original. The building was closed in 1949 but from 1961 to 1981 it served as residence for Mrs. Gilda Romero, who prevented its rapid deterioration. The Vieques municipality acquired the structure and carefully restored it in 1992.



National Archives, 1908









21

Vieques (Puerto Ferro)

The Puerto Ferro lighthouse entered service in December 1899, some eighteen months after the end of the Spanish-American War. It was designed by Francisco de Albacete and constructed over a plateau near the center of the island's south coast, to facilitate navigation along southeast Puerto Rico and into the local port, which exported sugar, cattle, and other products. This lighthouse is identical to the one at Punta Mulas, located opposite on the north coast, except that the details and the baseboard were painted dark gray, and the lens was more powerful.

The building measures 53 feet long by 35 feet wide. The 28-foot tall octagonal tower is at the center of the structure, its fifth-order lens projected the light twelve miles away. The two Vieques lights are the only Puerto Rican lighthouses built originally with two doors, of which the rear is flanked by two circular openings (bull's eyes) which ventilated the bathroom and the kitchen. Over the entrance facing the sea there is a base for a flag post, which does not figure in the original plans. Since both lighthouses

were constructed on high ground, their towers are short and their only opening to the outside is the door leading to the roof. Due to the presence of several cracks, funds were requested in 1920 to destroy the lighthouse and replace it with a new one, but the request was not granted. The lighthouse continued operating until 1926, when an earthquake caused additional damage; the building was then abandoned and a light was installed on a metal tower which collapsed years ago. Neglect and vandalism have left the lighthouse in ruins. Some of the roof beams have fallen and most of the remaining ones are in poor condition. The surrounding land belongs to the Vieques National Wildlife Refuge.





Note the remains of the handrail on the steps





Cistern and well



Condition of the roof

